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SOCIETIES AND ACADEMIES.

THE AMERICAN PHYSICAL SOCIETY.

THE spring meeting of the Physical Society was held at Washington, D. C., on Friday, April 20, and Saturday, April 21, 1906. President Barus presided.

The Friday session was held at the Cosmos Club, and the Saturday sessions at the National Bureau of Standards.

On Saturday afternoon Professor H. A. Lorentz, of Leyden, addressed the society on the subject of 'Gibbs's Statistical Mechanics.'

The program was as follows:

C. B. THWING: 'Measurements of the Internal Temperatures of Common Materials.'

J. G. COFFIN: 'On the Influence of Frequency upon the Self-inductance of Cylindrical Coils of Any Number of Layers.' (Read by title.)

E. B. ROSA: 'On the Geometric Mean Distance of Square Areas and their Use in the Calculation of Inductances.'

L. A. BAUER: 'Cheltenham Magnetic Observatory Registration of Effects from Electric Cars over Twelve Miles Distant.'

E. B. ROSA and F. W. GROVER: 'Mica Condensers as Standards of Capacity.'

L. W. AUSTIN: 'The Electrolytic Wave Detector.'

C. W. WARDNER and G. K. BURGESS: 'On the Determination of Melting Points by Radiation Methods.'

E. P. HYDE: 'Talbot's Law as Applied to the Rotating Sector Disk.'

H. B. BROOKS: 'A New Potentiometer.'

F. A. WOLFF: 'Direct Reading Methods for Resistance Comparisons.'

S. J. ALLEN: 'The Velocity and Ratio e/m for the Primary and Secondary Rays of Radium.'

A. H. PFUND: "New 'Reststrahlen.'"

A. H. PFUND: 'Study of Polarization Phenomena in the Infra-red.'

W. W. COBLENTZ: 'Note on a New Form of Radiometer.'

R. W. WOOD: 'Fish-eye Views.'

R. W. WOOD: 'Interference Colors of Chlorate of Potash Laminae.'

R. W. WOOD: 'Fluorescence and Magnetic Rotation of Vapors.'

R. W. WOOD: 'Resonance Radiation of Fluorescence of Sodium Vapor.'

E. B. ROSA and N. E. DORSEY: 'The Ratio of the Electromagnetic and Electrostatic Units.'

F. J. BATES: 'Spectral Lines as Light Sources in Polariscopic Measurements.'

W. W. COBLENTZ: 'Water of Crystallization and Water of Constitution.'

E. RUTHERFORD: 'Distribution of the Intensity of Radiation from Radioactive Substances.'

L. E. WOODMAN and H. W. WEBB: 'The Dispersion of Electric Waves.'

C. W. CHAMBERLAIN: 'Note on the Compound Interferometer.'

W. P. WHITE: 'The Constancy of Platinum Thermo-elements and other Thermo-element Problems.'

W. P. WHITE: 'Some Properties of Moving Coil Galvanometers.'

The next meeting of the society will be at Ithaca, N. Y., June 28 to July 3, in connection with the summer meeting of the American Association.

ERNEST MERRITT,
Secretary.

THE BIOLOGICAL SOCIETY OF WASHINGTON.

THE 415th meeting was held on March 31, 1906, Vice-president Palmer in the chair and twenty-nine persons present.

Dr. Ch. Wardell Stiles offered the first paper, 'A Plan to Insure the Establishment of Type Species of Genera.' He exhibited various sections of the card catalogue on medical and veterinary zoology, and explained the system adopted of using different colored cards to aid the memory in systematic zoology, nomenclature and geographic distribution.

He also explained a proposition he is now submitting to various organizations in order to insure the designation of type species for new genera. This proposition involves the adoption of a rule by publishing organizations to the effect that no papers containing new generic names will be accepted for publication unless the author designates the type species for every new generic name used. It was adopted independently by the Washington Biological Society, which was the first organization to set up the rule.

In reply to a question, Dr. Stiles stated in reference to Ashmead's genera described in keys and citing a type species that, even in the absence of any separate specific description, he considered these genera as valid; the case is

identical with those numerous cases in which authors describe a new genus based upon a specific description, without separate generic diagnosis, but headed *X-us albus* new genus, new species.

In reply to a question relative to the correct date of a genus based upon a generic description, but without accompanying specific name or specific description, he stated that he considered the date of publication of said genus the correct date. He saw no difficulty in taking a later specific name as type of an earlier generic name; such action is common, for instance, in case of renamed species, and no confusion arises therefrom. Thus, *lance-atum* (1896) is *lanceolatum* (1803) renamed, and is type of *Dicrocaelum* (1845). In all cases, however, the species in question must have been included in the genus from the standpoint of the author of the genus. Another case in point is *Dioctophyme* (1802), which, as the illustrations and habitat show, was clearly based upon *renale* (1782), although *renale* was not mentioned by name.

In reference to the arrangement to be followed in publishing genera, he stated that as secretary of the International Commission he had been obliged to consult numerous articles by various authors in fields outside of his own specialty, and that he had found the plan proposed by Dr. Evermann and as adopted by President Jordan and his coworkers to be the most convenient of any arrangement he had seen. Only one improvement occurred to him, namely, to give a reference to the family in connection with every generic diagnosis. He suggested the following as an ideal plan which would enable any author to comprehend the writings on groups with which he was not thoroughly familiar and as aiding the indexer in indexing the genera:

EQUUS Linnæus, 1758.

1758: *Equus* Linnæus, 1758, 73-74, Syst. nat., 10 ed. (type *caballus*; Eurasia); *equus* Latin, horse.

1815: *Caballus* Rafinesque, 1815, 55, Analyse de la Nature (*Equus* 1758 renamed, type *caballus*); *caballus* Latin, horse. *Generic diagnosis*.—Equidæ (p. — [refer here to page of family diagnosis]): [write generic diagnosis here].

The object of this arrangement is to enable a zoologist who is not acquainted with the recognized systematic position of a genus or with any possible differences of opinion on this point, to find the information he desires in the shortest possible time.

Further, many authors do not give in their entire article any clue to the family, ordinal or even class disposition of the new genera they publish or their idea as to the position of old genera.

The family diagnosis should give a clue to the order in which the family is classified. If this arrangement were adopted, any author could begin with a species and trace its systematic position without the slightest difficulty.

Dr. B. W. Evermann urged the desirability of Dr. Stiles's scheme and read the following rules, which have been promulgated by the U. S. Bureau of Fisheries as requirements to be observed by authors submitting to the bureau papers containing names of new genera or species:

New Genera.

1. Designate the family in which the proposed new genus belongs.

2. Designate the species taken as the type of the new genus.

New Species.

3. A single specimen shall be designated as the type of the species.

4. Other specimens studied at the same time and believed to be conspecific with the type should be designated as cotypes.

5. The size and condition of the type, the museum in which it is deposited, and the number which it bears on the register of said museum shall be given.

6. The type locality, collector and date of collecting must be given.

The same rules apply to subgenera and subspecies.

The types of all new species first described in the publications of this bureau will, except in exceptional cases, be deposited in the U. S. National Museum.

The second paper was by Dr. Rodney H. True on 'The Cultivation of Tea in the United States,' and was illustrated with lan-

tern slides, and by samples of tea in both the rolled and tablet form.

Owing to the large and steady demand for tea in the United States, both the government and private parties have from time to time given more or less attention to the propagation of tea with reference to the possibility of bringing up an industry. The most serious attempt in this direction was begun by Dr. Charles U. Shepard, at Summerville, S. C., as a private enterprise some years since. This enterprise has been in part supported by the Department of Agriculture in cooperation with Dr. Shepard. Attention has been given not only to the cultivation of the plant under the conditions of the Carolinas, but also to the introduction where possible of machine methods. This has resulted in the invention of a number of very useful labor-saving devices, which have placed a large part of the work connected with the manufacture of tea on a machine basis, with a considerable consequent reduction of the cost of production. As a general outcome of the experiments during the last season, it may be stated that the crop amounted to about five and a half tons of high-grade tea, which has been satisfactorily disposed of through the usual channels of tea commerce.

Recently the broken tea-leaf has been most satisfactorily utilized in the form of tablets. The tea powder contains sufficient oily material to cement the mass under high pressure into firm tablets, which readily fall apart when treated with hot water. The compact form of the tablets does not interfere with the desirable qualities of the tea and makes a product which is proving very popular where compactness is desired.

The question of the commercial production of tea at this location seems to be in a fair way toward ultimate favorable solution. A number of important problems, however, still remain to be solved.

The Department of Agriculture has established another tea farm at Pierce, Texas, where about forty acres are now planted with young tea. Matters have not progressed far enough as yet to warrant any statement re-

garding the probable outcome of this feature of the experiment, beyond the mere statement that some small samples of tea made from the young bushes form a product of very high quality.

Laboratory studies at Washington and at Summerville, S. C., in connection with Dr. Shepard's work, have demonstrated some important scientific facts which have a distinct bearing on the tea industry. The process of fermentation, which produces a product characterized by the general qualities of so-called black tea, is due to oxidizing enzymes present in the tea leaf operating on other bodies present in the leaf, resulting in the development of compounds giving the characteristic color, taste and odor of the black tea. In green tea this fermentation process is prevented by the destruction of the oxidizing enzymes by the application of heat to the newly picked leaves. Further investigations, carried on in cooperation with Dr. Edward Kremers, of Madison, Wis., indicate that the aromatic qualities of the tea leaf are not due, as is currently believed, to preformed volatile oils found in the leaf, but to aromatic bodies developed in the tea leaf by the factory processes, particularly during the firing process.

M. C. MARSH,
Recording Secretary.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

At the 181st meeting of the society on May 9, the following papers were read:

Normal Faulting in Northern China: Mr. BAILEY WILLIS.

A Type of Vein Structure in the Southern Appalachians: Mr. L. C. GRATON.

Two Occurrences of Graphite: Mr. GEO. OTIS SMITH.

Mr. Smith described two occurrences of graphite in western Maine which had been visited by him in 1905. These illustrate two modes of origin and the genetic relationships have a direct bearing upon the question of economic value of the deposits.

At Madrid, the graphite occurs locally in schist at the contact with irregular bodies of pegmatite. Some of the schist beds are rela-

tively barren and this variation in graphite content is believed to express the original difference in percentage of carbon in the sediments. The graphite grains are minute and intimately associated with muscovite and quartz. The Madrid graphite is regarded as the product of the conversion and concentration of carbonaceous particles of sedimentary origin through the agency of heated vapors from the pegmatite magma.

In Yarmouth, the graphite is found within a pegmatite dike which cuts a large granite mass. The graphite in flakes and large masses is a well-distributed constituent of the pegmatite, and with the quartz and feldspar forms the usual mosaic. No evidence was noted of any source of the carbon of the graphite other than in the molten rock which intruded the granite itself, the graphite being as much an essential and original constituent of the pegmatite as is the quartz or the feldspar.

Copper Deposits of the Zuñi Mountains, New Mexico: Mr. F. C. SCHRADER.

The Zuñi Mountains form a group about twenty miles long and fifty miles wide, situated some eighty-five miles west of Albuquerque. They are composed of pre-Cambrian schists, gneisses and granites, and are flanked on all sides by gently upturned strata regarded as of upper Carboniferous age—the ‘red beds’ of the Colorado Plateau region. Mount Sedgewick, the highest summit of the group, rising 2,000 feet above the surrounding plateau, reaches an elevation of 9,200 feet. The topography is for the most part not rugged and nearly every portion of the district may be reached by wagons. The drainage goes to the Rio Grande by way of the Blue Water and San Jose rivers on the north, and the Agua Fria on the south. The trend of the mountains and of the dominant structure in the pre-Cambrian rocks is a little north of west, and the foliation of the schists and gneisses dips steeply toward the south.

Copperton, the principal mining camp, is situated in the heart of the mountains about twenty miles west of the Atlantic and Pacific Trans-Continental Railway.

Copper deposits are found both in the pre-Cambrian rocks and in the lower strata of the ‘red beds.’ In both situations the ores thus far revealed consist almost entirely of secondary copper minerals including green and blue carbonates and copper glance. Chalcopyrite, though present, is uncommon.

In the Pre-Cambrian the ores occur along sheeted zones in the schists or gneisses, sometimes associated with quartz in irregular vein-like bodies, but to a greater extent disseminated through the rocks of the mineralized zones. These zones vary in width, the widest observed being 800 feet across. They are often persistent for considerable distances, and in several instances the presence of workable amounts of rock carrying above three per cent. metallic copper has been demonstrated. The usual minerals associated with these ores are quartz, specular iron, limonite, galena, and pyrite. Gold values are said to run from one dollar to four dollars per ton.

The basal strata of the ‘red beds’ which carry copper minerals are from thirty to sixty feet in thickness. At the bottom is an arkose conglomerate and above this there are layers of sandstone and shale. In the northwest part of the district the conglomerate may be seen resting upon the baset edges of the crystalline pre-Cambrian rocks. The ore minerals are locally disseminated through the rocks, and where occurring in the conglomerate appear to have been deposited with the sand and gravel which compose the rock. If this suggestion is correct, the copper minerals were probably derived by erosion from the pre-existing deposits in the crystalline formations. The ore-bearing strata, and especially the shaly beds, contain considerable amounts of fossil wood, and this material has been very largely replaced by copper carbonates and glance, and cuprefacts produced in this way form an important portion of the ‘red bed’ ores.

The district has been under development for about five years, but as yet there are no shipping mines. Annual assessment work is done on some 200 claims controlled by about 75 individuals. The region is well watered and forested, and the climate is a pleasant one.

At a special meeting on the evening of May 18, the following illustrated papers were presented:

Epitome of the Geologic History of the California Coast Ranges: Mr. F. L. RANSOME.
Evidence of Geologically Recent Movements near San Francisco: Mr. GEO. H. ASHLEY.
Location and Character of the Faults in the Earthquake Region: Mr. RALPH ARNOLD.

Lantern views showing some effects of the earthquake: These views, sent by Messrs. G. K. Gilbert and W. C. Mendenhall, were exhibited by Mr. Ashley.

Seismograph and Magnetograph Records of the San Francisco Earthquake: Mr. L. A. BAUER.

Comparative Intensities of the New Madrid, Charleston and San Francisco Earthquakes: Mr. M. L. FULLER.

While all conclusions regarding the San Francisco shock must necessarily be provisional until the publication of accurate scientific data, sufficient evidence is at hand to warrant certain general conclusions as to its intensity as compared with the New Madrid earthquake which shook the Mississippi Valley in 1811-12 and the Charleston disturbance of 1886. Considering first the area affected by fissuring, we find such phenomena have been reported to extend at least 125 miles both north and south of San Francisco and throughout a belt 50 miles wide. At New Madrid the length of the disturbed area was 110 miles and the width about 60 miles, while at Charleston it was only 30 miles long and 20 miles broad. It should be noted, however, that at San Francisco the fissuring occurred only at widely separated points where the conditions were peculiarly favorable, while in the New Madrid and Charleston areas the entire surface within the limits mentioned was affected.

The main San Francisco shocks appear to have lasted only about one and one-fourth minutes, with slighter tremors for a few hours and occasional light shocks for several days. At Charleston the severe tremors were likewise confined to a few hours, but at New Madrid they continued at short intervals for

over a year, nearly 2,000 shocks, 53 of which were severe, occurring in the first three months. The effect on buildings was also greatest at New Madrid, even low cabins being shaken down, but at Charleston relatively few of even the larger buildings were destroyed although many were injured. The destruction at San Francisco was somewhat greater, but the better class of buildings, especially the steel structures, generally escaped. The magnitude of the surface undulations was greater at Charleston than at San Francisco and greatest of all at New Madrid, in which region considerable areas of forest were thrown down even on the level ground, while the bluffs were literally shaken to pieces, the resulting landslides converting them into jumbles of earth heaps and tree trunks for a distance of 100 miles. Such landslides were absent at Charleston, but occurred occasionally at San Francisco, although much less frequent and conspicuous than at New Madrid.

Tidal waves were practically absent both at San Francisco and at Charleston, but at New Madrid the Mississippi was disturbed by great waves which destroyed much of the shipping and the current even retrogressed in certain localities. Cracks and craterlets, with possibly one or two exceptions, seem to have been absent in the San Francisco region, but were common at Charleston and New Madrid. In the former locality the cracks were usually less than an inch across, but in the latter were often many feet in diameter. Craterlets abounded in both localities, but both in the area covered and in number and amount of sand and water extruded, New Madrid stands first. The courses of the streams were little affected at San Francisco or Charleston, but in the New Madrid area the courses of many were changed, the water following new cracks instead of the old channels. Others were deflected by the warping of the surface, while still others were obstructed by faults or sharp folds giving rise to extensive marshes or large lakes of open water. In fact the New Madrid area seems to be the only one of the three in which the general level of the land was notably affected.

Various other lines of evidence all point to the same conclusion—that every type of earthquake phenomena was more pronounced in the earlier than in either of the more recent shocks. The destructiveness, owing to geologic conditions, was somewhat greater at San Francisco than at Charleston, although the actual intensity of the Charleston shock was greater.

The New Madrid earthquake is believed to have been due to faulting produced by local overloading of the crust by the Mississippi embayment deposits. Evidences of prehistoric shocks have been found and it is known that the readjustment is still in progress. Shocks are to be expected in the future which may be disastrous to the small towns near the Missouri-Arkansas line, if not to the cities of Memphis and Cairo, and possibly to St. Louis. The cause of the Charleston shock was probably similar to that at New Madrid, but there are no indications of earlier disturbances, and none of importance have occurred since 1886. The conditions at that point are not threatening. The San Francisco shock was due to the readjustment of one or more faults due to mountain-building forces which have long been in operation. Evidences may be seen of past disturbances far greater than the present, and, while possibly the present generation may have little to fear owing to the temporary equilibrium which has been established, there will almost certainly be as great or greater disturbances in the future as in the past.

ARTHUR C. SPENCER,
Secretary.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 619th meeting was held May 19, 1906, Vice-president Bauer in the chair.

Announcement was made of the election of ten new members.

Memorial papers were read on three deceased members, all connected with the Coast and Geodetic Survey: On Mr. H. G. Ogden and Mr. E. D. Preston, prepared by invitation by Mr. W. B. Chilton, and on Mr. F. M. Little, by Mr. L. P. Shidy. Further remarks and personal tributes were added by Messrs. Bauer, Hayford and Gore.

Several informal communications were then made:

Mr. Burbank had investigated the radioactive substance in the atmosphere and finds about twenty-five per cent. of it to be thorium.

Mr. Wead pointed out the similarity between the increase in wave-length of spectral lines in dense gases, found in Humphries's experiments, and that indicated by the ordinary formula for vibration with high damping, and suggested new experiments.

Mr. Hayford read a letter from M. Guilleaume, of the International Bureau, describing the recent measurement in the Simplon tunnel of a twenty-kilometer base-line in three days and nights, using his nickel-steel bars.

Mr. Rosa called attention to the two illogical terms in the table of lengths—the tenth-meter and $\mu\mu$; the logical series with ratio 1,000:1 would be:

km, m, mm, μ , $m\mu$, $\mu\mu$.

The society then adjourned till October 13.

CHARLES K. WEAD,
Secretary.

THE ST. LOUIS CHEMICAL SOCIETY.

At the meeting of the society on May 14, Mr. J. J. Kessler presented a paper entitled 'The Physical Structure of Metals and Alloys.' The speaker dwelt on the light shed on the mystery of alloys by physical chemistry and by microscopic examinations. The minute structure of a material can not be revealed by purely chemical examination, but it is revealed in the microscope. The speaker then explained the preparation of the surface for microscopic examination by polishing and etching. The paper was profusely illustrated by excellent slides made from microphotographs of all phases of structure of both pure metals and alloys.

C. J. BORGMAYER,
Corresponding Secretary.

COLORADO CONFERENCE OF SCIENCE WORKERS.

A STATE conference of science workers was held in Boulder at the University of Colorado on May 4 and 5, 1906. The program of the conference was as follows and all papers were presented by the authors.

G. L. CANNON: 'The Necessity for Science Conferences in Colorado.'

JUNIUS HENDERSON: 'The Collecting of Mollusks in Colorado.'

T. D. A. COCKERELL: 'The Fossil Beds of Florissant.'

A. E. BEARDSLEY: 'The Crustaceans of Colorado.'

H. E. SOVEREIGN: 'Apparatus illustrating the Laws of Electromagnetic Induction.'

A. N. FINN: 'A Report on the Quantitative Analysis of Uranium and Vanadium.'

J. ARTHUR BIRCHLEY: 'A Study of the Kater Pendulum.'

WM. DUANE: 'New Kinds of Radiation.'

G. S. DODDS: 'The Projection Microscope for Work in Botany and Zoology.'

W. D. ENGLE: 'The Effect of Bile on the Surface Tension of Water.'

GEORGE I. FINLEY: 'Recent Geological Correlation Work in the Cañon City Field.'

PHILIP FITCH: 'A Review of the Development of the Modern Kinetic Theory of Gases as a Basis for the Study of Radioactivity.'

F. L. ABBOTT: 'Producer-gas and Producer-gas Engines.'

J. VINCENT DANIELS: 'A Report on the Formation of Malic Acid by Fermentation.'

All of the institutions in the state of collegiate grade were represented by delegates, and a number of the larger high schools as well. A public address was given by Professor Thomas H. MacBride, of the State University of Iowa, his subject being 'The Response of Plants.'

FRANCIS RAMALEY,
Secretary, Local Committee.

DISCUSSION AND CORRESPONDENCE.

A PERSISTENT ERROR.

MY attention has recently been called to an error in the use of geologic names, which, since I am inadvertently responsible, it seems desirable I should correct.

The terms Des Moines and Missourian have been in use for some years, especially in the publications of the Iowa and Missouri Surveys, for the lower and upper coal measures of the older classification. When I prepared for the 22d Annual Report of the U. S. Geological Survey a brief discussion of the western interior coal field, I was located in a mining camp with no opportunity for stenographic

services. The report was, therefore, written out in long hand and sent down to Washington to be copied. Instead of being returned to me it went through the press, and I had no opportunity to examine it until the printed copies came to hand. It seems that in one of the early pages of the manuscript, by some inadvertence I had transposed the terms. The editor with painstaking care transposed them through all the remainder of the manuscript to correspond to this one wrong usage, and they appeared in this form in the published paper. The mistake was to my mind so obvious, and the usage so well established, that I never considered it worth while to make the correction. However, it misled Dr. Buckley, of the Missouri Survey, and in his report on the quarry industry the terms are accordingly misused. His attention having been called to this, the following note was made in the Geology of Moniteau County, page 8:

Attention is here called to the names Missourian and Des Moines, in the use of which there is evidently some confusion. In the earlier reports of the Iowa and Missouri Geological Surveys the term 'Missourian' has been applied to the upper coal measures, and the term 'Des Moines' to the lower coal measures. In the late reports of the U. S. Geological Survey (22d Annual Report, part 3, plate 22, page 341), their use has been reversed, the term 'Missourian' being applied to the lower coal measures, and the term 'Des Moines' to the upper coal measures. These names were first applied in the Missouri reports during the Keyes administration, and there appears to be no good reason for reversing their application.

This would seem to have been sufficient to make the matter clear, but in the report of the coal-testing plant of the U. S. Geological Survey, Professional Paper 48, page 74, the wrong usage again appears. I desire, therefore, to enter protest in public against the persistence of the usage, which was a typographical mistake to begin with, and for which there is, as Dr. Buckley says, no good reason.

H. FOSTER BAIN.

THE NORTHERN LIMIT OF THE PAPA TREE.

THE article by Dr. C. A. White in the May 11 issue of SCIENCE on the northern limit of